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SUMMARY

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PROTECTION FROM INSECT AND VERTEBRATE PESTS IN RELATION TO CROP PRODUCTION

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Protection From Insect and Vertebrate Pests in Relation to Crop Production

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SUMMARY

1. Insect and vertebrate pests represent major obstacles to agricultural production, and methods for their control ar necessary for an efficient agricultural economy. However, many kinds of insects and vertebrates are highly beneficial and are needed to maintain a reasonable balance between the destructive and useful organisms. Chemicals now provide the chief means of controlling insects affecting crops in the United States. A wide variety of material is available, including DDT, methoxychlor, lindane, toxaphene, aldrin, dieldrin, heptachlor, endrin, parathion, malathion, Guthion, Phosdrin, naled, demeton, phorate, diazinon, Sevin, pyrethrins, rotenone, and ryania. These insecticides and others have been responsible for substantial increases in yield and improved quality of many crops. However, the extensive use of insecticides has necessitated special research and careful selection of insecticides and methods of use to avoid residues on crops or to meet tolerances. The side effects on beneficial insects and fish and wildlife have also posed problems that are being given greater attention in research. Other methods of insect control utilized in the United States include cultural practices, importation and establishment of parasites and predators, development of crop varieties resistant to insect attack, use of insect attractants and baits, development and use of insect pathogens, and the use of the new autocidal sterile-male procedure.

2. Research on insect control is emphasizing the development of chemicals that leave no residues; the integration of insecticides and biological-control agents; greater use of bacteria, viruses, fungi, and other pathogens; parasites and predators for controlling destructive insects; the development of crop varieties resistant to insect attack; and the development of the sterility procedure. The research on the sterility principle involves both atomic radiation and chemicals that produce sterility in insects. The discovery of the nature of the chemical in virgin females which attracts the males of the gypsy moth has opened a new line of research on attractants highly specific in action for other insects. The use of attractants and sterility agents provides possibilities for improving insect-control methods.

3. Advances in regulating vertebrate pests which damage crops have been substantial. Highly effective chemicals, some of which are quite specific for a narrow range of vertebrate species, areavailable for controlling rodents. Certain toxicants give quick knockdown; others cause a delayed effect. Some materials may be used in baits and distributed by aircraft or mechanical ground equipment. Others may be applied as liquid sprays to field habitats. When toxicants are blanketed over the habitat, complete freedom from adverse side effects is not yet possible. Research on chemicals for regulating vertebrate

pests is emphasizing chemicals that are specific in toxic effect on the pest to be controlled, on repellents, on chemosterilants, and on anaesthetizing compounds. Mechanical means of vertebrate control also under investigation include studies on the responses of birds to light of different colors and intensity and to amplified distress calls. Plant-breeding investigations designed to develop crop varieties which ripen early and thus escape bird migrations, the development of favorable growth characteristics such as tight shucks on corn (Zea maize), and other favorable characteristics, are also being undertaken. Improvements in traps, one of man's first tools in his competition with other vertebrates, are also being made.

4.. Scientists in the United States are prepared to share with other scientists throughout the world the new developments in research that offer ways to deal with different invertebrate and vertebrate pests. Many opportunities exist for the exchange of information and materials that can lead to more rapid and efficient systems for dealing with these competitors for food and other essential agricultural commodities.

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